

What is Claimed is:

1. A resonator having:
 - a dielectric element;
 - a housing of accommodating said dielectric element; and
 - a holding member of holding said dielectric element so as to have a predetermined clearance generated between a dielectric element surface of said dielectric element to which a generated electric field is substantially orthogonal and a housing surface of said housing opposed to the dielectric element surface.
2. The resonator according to claim 1, wherein said dielectric element is the dielectric element operating in a TE mode; and
 - said electric field is the electric field operating in said TE mode.
3. The resonator according to claim 1, wherein said holding member is the holding member formed in said predetermined clearance by utilizing a predetermined low relative permittivity material.
4. The resonator according to claim 1, wherein:
 - said dielectric element has a half-cylindrical shape obtained when a cylindrical shape is severed by a plane including its central axis; and
 - said dielectric element surface is a surface severed by said plane.

5. The resonator according to claim 4, further having signal input-output probes of inputting and outputting a signal provided by utilizing a housing surface on which said dielectric element is held.

6. The resonator according to claim 1, wherein:

said dielectric element has a quarter-cylindrical shape obtained when a cylindrical shape is severed by two mutually orthogonal planes including its central axis; and

said dielectric element surface is two surfaces severed by said two planes.

7. The resonator according to claim 6, wherein said dielectric element is held by utilizing two adjacent housing surfaces of said housing, and further having signal input-output probes of inputting and outputting a signal provided by utilizing one of said two adjacent housing surfaces.

8. The resonator according to claim 4 or 6, wherein said cylindrical shape has a hole at the center thereof.

9. The resonator according to claim 1, wherein:

said dielectric element has a polygonal shape obtained when a polygonal shape is severed by a plane; and

said dielectric element surface is a surface severed by said plane.

10. The resonator according to claim 9, further having signal input-output probes of inputting and outputting a signal

provided by utilizing a housing surface on which said dielectric element is held.

11. A filter having:

a plurality of dielectric elements;

a housing of accommodating said dielectric elements; and

one or a plurality of holding members of holding said dielectric elements so as to have a predetermined clearance generated between dielectric element surfaces of said dielectric elements to which a generated electric field is substantially orthogonal and a housing surface of said housing opposed to the dielectric element surfaces.

12. The filter according to claim 11, wherein said dielectric elements are the dielectric elements operating in a TE mode; and

said electric field is the electric field generated in said TE mode.

13. The filter according to claim 11, wherein said holding member is the holding member formed in said predetermined clearance by utilizing a predetermined low relative permittivity material.

14. The filter according to claim 11, wherein said holding members are the holding members holding two or more of said dielectric elements in common.

15. The filter according to claim 11, wherein:

said dielectric elements have a half-cylindrical shape obtained when a cylindrical shape is severed by a plane including its central axis; and

said dielectric element surfaces are the surfaces severed by said plane.

16. The filter according to claim 15, further having signal input-output probes of inputting and outputting a signal provided by utilizing a housing surface on which said dielectric elements are held.

17. The filter according to claim 11, wherein:

said dielectric elements have a quarter-cylindrical shape obtained when a cylindrical shape is severed by two mutually orthogonal planes including its central axis; and

said dielectric element surface is two surfaces severed by said two planes.

18. The filter according to claim 17, wherein said dielectric elements are held by utilizing two adjacent housing surfaces of said housing, and further having signal input-output probes of inputting and outputting a signal provided by utilizing one of said two adjacent housing surfaces.

19. The filter according to claim 15 or 17, wherein said cylindrical shape has a hole at the center thereof.

20. The filter according to claim 11, wherein:

said dielectric elements have a polygonal pole shape obtained when a polygonal pole shape is severed by a plane; and

said dielectric element surfaces are the surfaces severed by said plane.

21. The filter according to claim 20, further having a signal input-output probes of inputting and outputting a signal provided by utilizing a housing surface on which said dielectric elements are held.

22. A communication apparatus having:

sending/receiving means of performing sending and/or receiving; and

the resonators according to claim 1 or the filters according to claim 11 of filtering a sending signal to be utilized for said sending and/or a receiving signal to be utilized for said receiving.

23. A resonator manufacturing method having a holding member formation step of forming a holding member of holding a dielectric element so as to have a predetermined clearance generated between a dielectric element surface of said dielectric element to which a generated electric field is substantially orthogonal and a housing surface of a housing of accommodating said dielectric element opposed to the dielectric element surface.

24. A filter manufacturing method having a holding member formation step of forming one or a plurality of holding members of holding a plurality of dielectric elements so as to have a predetermined clearance generated between dielectric element surfaces of said dielectric elements to which a generated electric field is substantially orthogonal and a housing surface of a housing of accommodating said dielectric elements opposed to the dielectric element surfaces.